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April 10, 1997

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Federal Communications Commission
Office of Secretary

Mr. William F. Caton
Secretary
Federal Communications Commission
1919 M Street, N.W.
Room 222
Washington, D.C. 20554

Re: IB Docket No. 96-220, Notice of Ex Parte Presentation

Dear Mr. Caton:

Pursuant to Section 1.1206 of the Commission's Rules, this letter provides notice that on March 19, 1997, E-SAT, Inc. ("E-SAT") and GE Starsys Global Positioning, Inc. ("STARSYS"), met with Thomas Tycz, Harold Ng, Paula Ford and Julie Garcia of the Satellite and Radiocommunications Division of the International Bureau. Attending the meeting on behalf of E-SAT was Fred Thompson, as well as the undersigned. Attending on behalf of STARSYS were Alan Renshaw and Ken Newcomer, as well as David Sieradzki and Peter Rohrbach of Hogan and Hartson.

At the meeting E-SAT provided information concerning its system design and operations which would permit it to utilize spectrum without causing unacceptable interference to STARSYS or other non-voice, non-geostationary licensees. Attached is a summary of the presentation made by E-SAT.

Respectfully submitted,

Leslie A. Taylor

Leslie A. Taylor
Counsel, E-SAT, Inc.

cc: Thomas Tycz, International Bureau
Harold Ng, International Bureau
Paula Ford, International Bureau
Julie Garcia, International Bureau
Ruth Milkman, International Bureau
Peter Rohrbach, Hogan & Hartson

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I. How the E-SAT System Operates

E-SAT proposes to use six satellites for store and forward communications. No real time service is contemplated. E-SAT uses very low power user transceivers to transmit, on a pre-programmed basis, very short messages to the spacecraft. The signals received at the spacecraft are demodulated and then transmitted to the gateway earth stations outside the United States. These gateways will be located at far northern and southern latitudes (Fairbanks, Alaska, Norway and Australia) to provide geographic separation from other users of these bands.

The E-SAT system will transmit a signal to its transceivers alerting them to transmit to the satellite. This downlink signal will be pre-programmed and coordinated with the operations of the other CDMA systems (STARSYS and S-80) so that the downlink transmissions are not made when there is a possibility of interference into the STARSYS or S-80 gateway antennas. Because E-SAT has total flexibility over the schedule of both downlink and uplink transmissions, it can avoid causing unacceptable interference to these systems.

E-SAT's feeder links will be contained in the bandwidth used for service links. It does not need any dedicated feeder links in the Earth-to-space or space-to-Earth direction.

II. Summary of E-SAT technical characteristics relevant to sharing with other NVNG MSS systems (link budgets)

The link budgets for the E-SAT service links are attached to this document.

Because the gateway earth stations will not be located in the United States, and dedicated feeder link assignments are not requested, link budgets are not provided for the links from the satellite to the gateway station and from the gateway stations to the satellite.

III. E-SAT Spectrum Use Plan

<u>Earth-to-space</u>

There are two primary uses for Earth-to-space spectrum which are distinctly different. The implementations are distinctly different. The first use of the Earth-to-space link is for transmitting data from remote users (e.g., electric meters or gas meters) to the E-SAT satellite for storage in the satellite. This link will be a Direct Sequence Spread Spectrum technique over a 1.4 MHz band. This band will be from 148.450 - 149.900 MHz. The received signal is completely demodulated and despread at the satellite. Only the actual data from the meters is stored in the satellite memory.

The other use of Earth-to-space transmissions is for TT&C and scheduling of the remote user reads. As the satellite passes over one of the Gateway Earth Stations, the Earth station transmits satellite control information and any scheduling information that may be required for remote meter reads. This data is stored in the satellite until the appropriate time tagged action is required. E-SAT plans three main Gateway Earth Stations. In order of primary to secondary usage, these will be located in Longyearbyen, Svalbard, Norway; Fairbanks, Alaska, USA; and Perth, Western Australia, Australia. These links shall use a fraction of the same spectrum as the Spread Spectrum use given above. The Feederlink Earth Stations will have high gain antennas. This means the beam to the satellite is highly directional, allowing even greater separation.

Space-to-Earth

As with the Earth-to-space segment, there are two distinct uses for the space-to-Earth spectrum. The first use is for the transmission of a timing and scheduling signal from the spacecraft to the remote users. This link will be a Direct Sequence Spread Spectrum technique over a 1 MHz band. This band will be from 137 - 138 MHz. As is done in the uplink, the received signal of the remote user is completely demodulated and despread within the remote user set. Only the actual time keeping and scheduling data from the satellite is stored in the remote user memory.

The other use of space-to-Earth transmissions is for transmitting satellite status (housekeeping) and orbit data and stored remote user data down to the Gateway Earth Stations. As the satellites pass over the Earth stations they will "dump" all the data that was stored on the previous orbit which was received from the remote users. It is anticipated that by utilizing the Longyearbyen, Svalbard, Norway site and with limited use of the Fairbanks, Alaska, USA site, that sufficient contact can be made with each satellite to allow for download of all the anticipated data. The Perth, Western Australia, Australia site shall be utilized as a backup to the other two sites and will be used only when both primary sites are unavailable.

IV. Explanation of how other NVNG MSS systems using these frequency bands will not experience unacceptable interference from E-SAT transmissions.

A. Feeder links

E-SAT's feeder links will be located in geographically remote areas and will utilize antennas with a relatively small footprint.[1] The attached orbital coverage plots show the footprint of an E-SAT feeder downlink at the middle and the end of its

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[1] The beamwidth of the feederlink antenna is 57°. The E-SAT satellite will operate at a constant altitude of 893 kilometers, resulting in a footprint smaller than the state of Alaska.

transmission pass. The spatial separation of the feeder uplinks and downlinks will guarantee that no interference is caused to other users of the bands.

B. Service Links

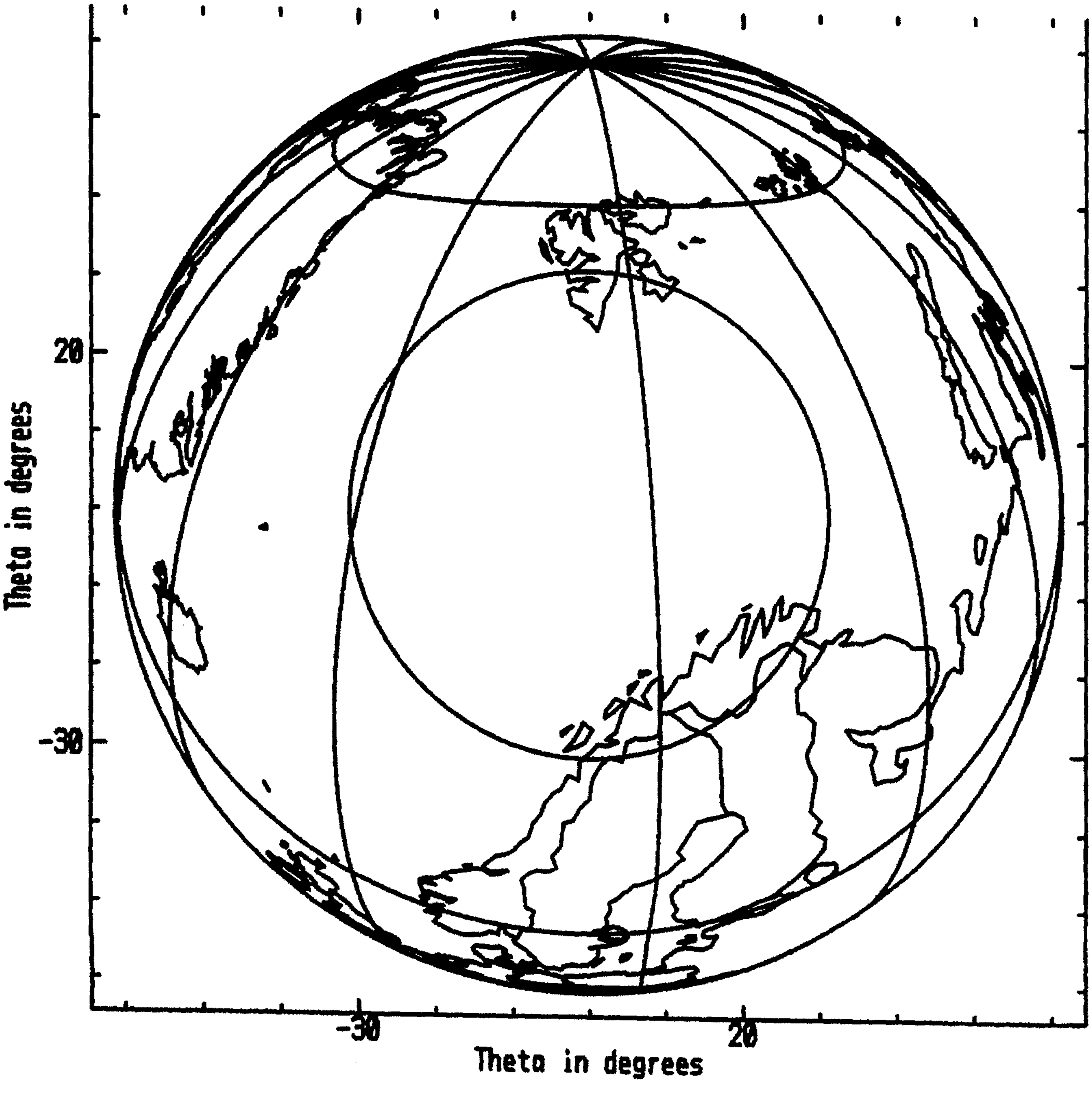
1. Narrowband users

E-SAT's power flux density (pfd) in both the space-to-Earth and Earth-to-space direction will be below the receive threshold of narrowband users of the band. Because E-SAT will operate with a pfd of -158 $dBW/M^2/4kHz$ (downlink - measured on the ground), and -161 $dBW/M^2/4kHz$ (uplink - measured in space), narrowband users of the band will not be able to detect the E-SAT signal.

2. Spread-spectrum users

E-SAT will use an opposite circular polarization from Starsys and will use different CDMA code strings to allow co-frequency sharing. In the case of the uplink, E-SAT's center frequency will be offset from the center frequency of Starsys. E-SAT will pick a code set that is orthogonal to that used by Starsys in both uplink and downlink.

E-SAT will not operate co-frequency with S-80.



20
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Theta in degrees
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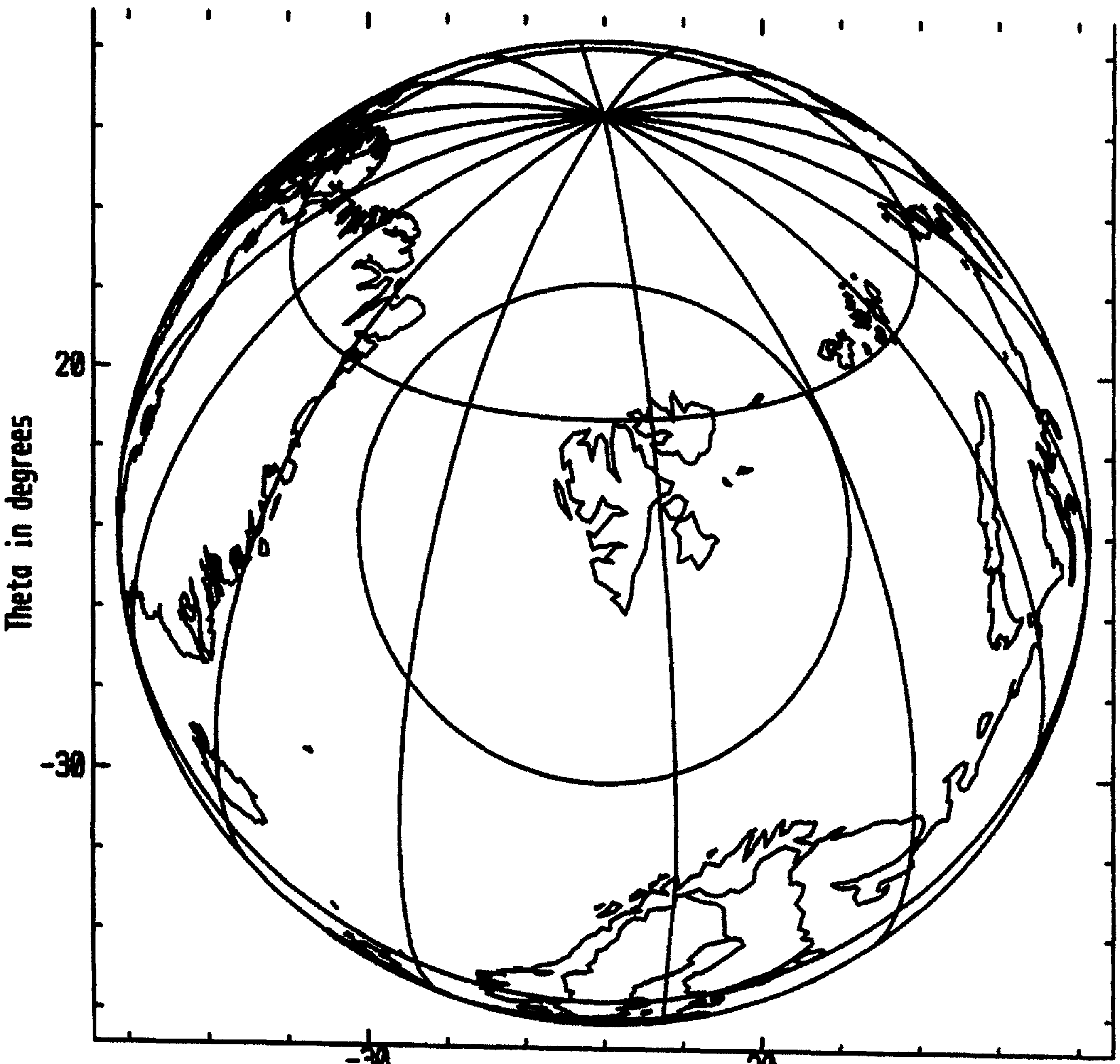
Theta in degrees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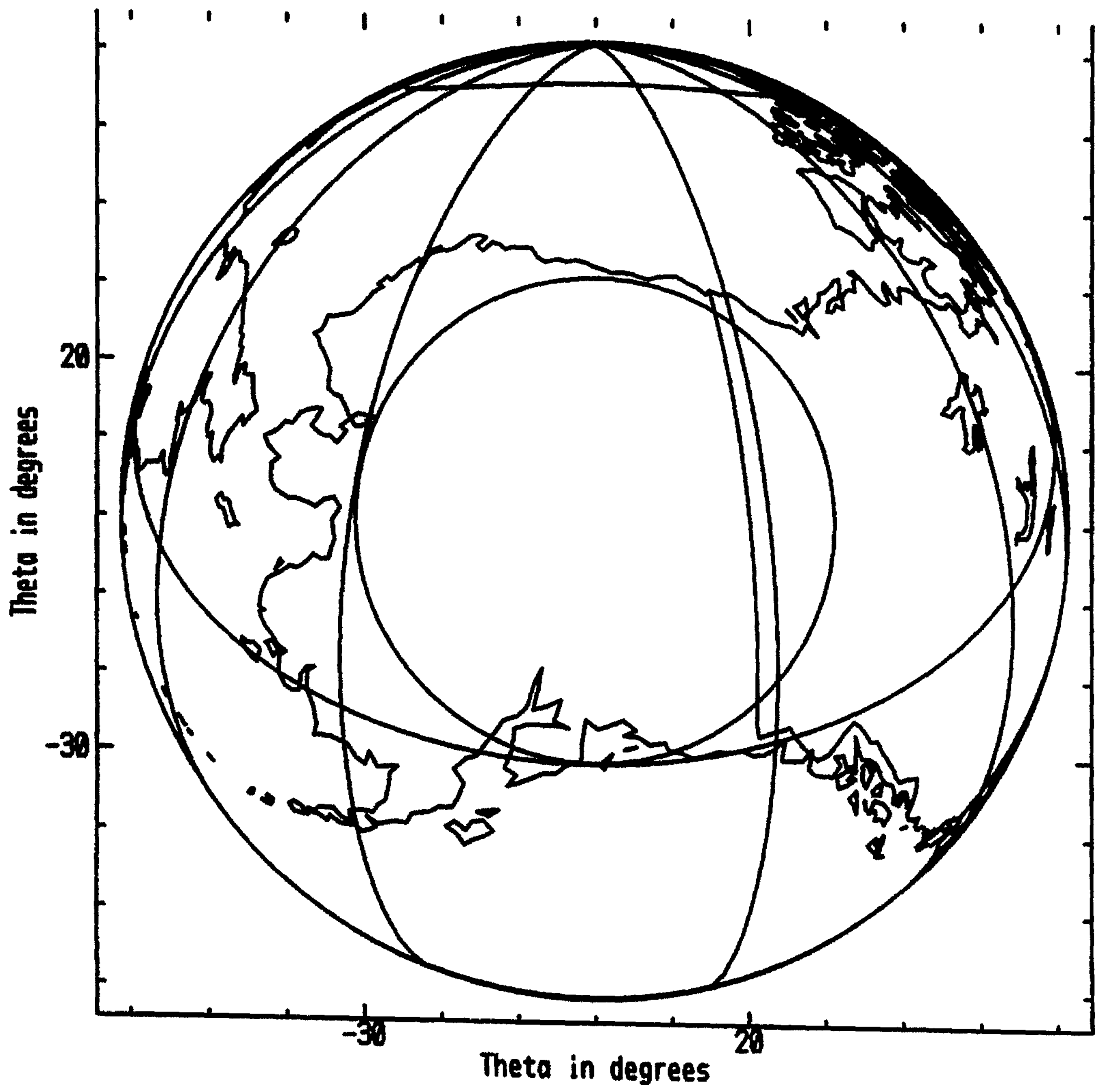

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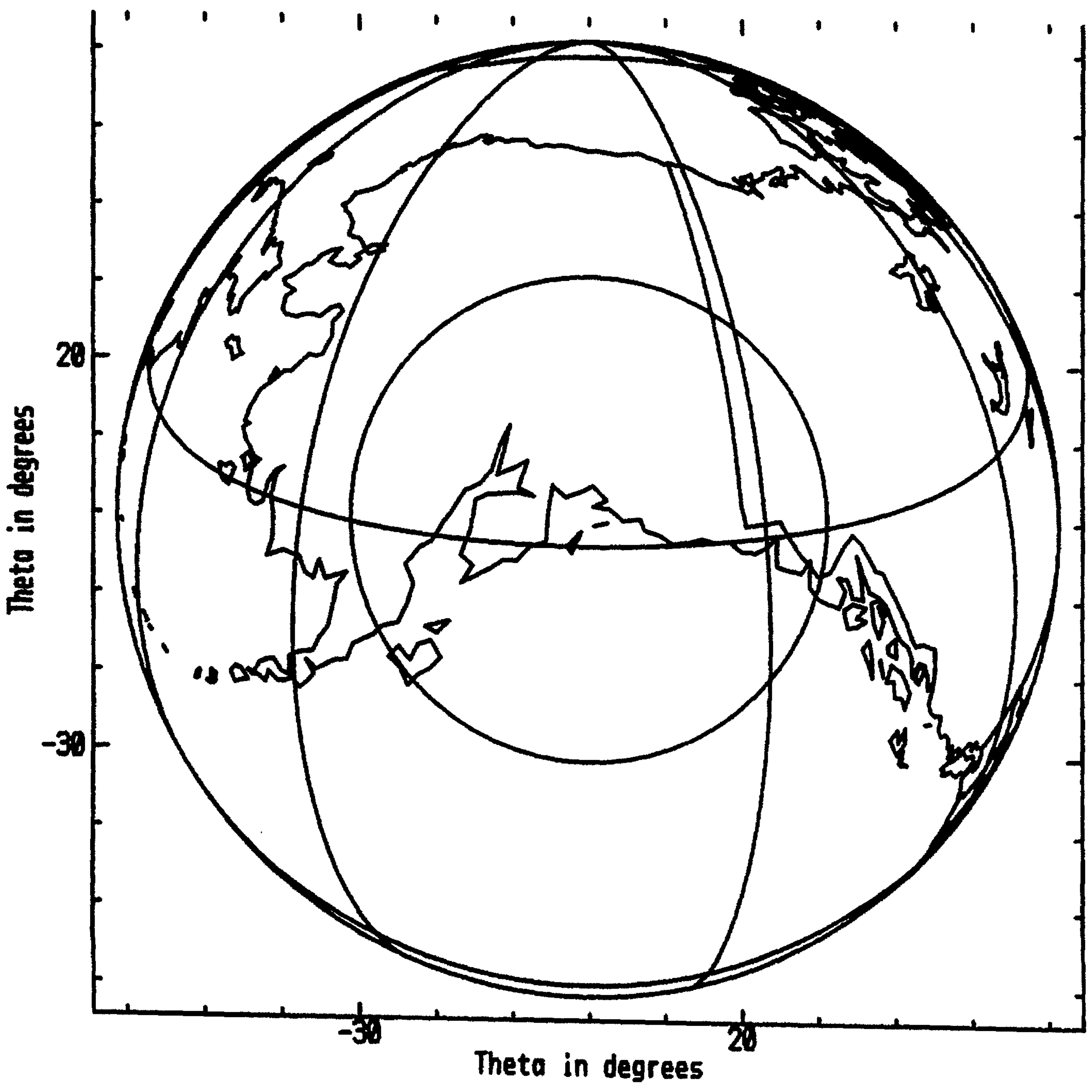

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Theta in degrees
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Theta in degrees

Sheet3

Center Frequency	149.225	MHz		
Transmitting RF Power	3.00	Watts	4.77	dBW
Transmitter Line Loss	0.77	dB	(0.77)	dB
Transmitting Antenna Gain	(3.00)	dBi	(3.00)	dB
EIRP per User			1.00	dBW
EIRP per User per 4 kHz			(24.59)	dBW
Free Space Path Loss	135.60	dB	(135.60)	dB
Atmospheric Loss	0.20	dB	(0.20)	dB
Rain Loss	-	dB	-	dB
Polarization Loss	0.50	dB	(0.50)	dB
Antenna Pointing Loss	0.05	dB	(0.05)	dB
Received Power Flux Density per User			(135.35)	dBW
Received PFD per User per 4kHz			(160.94)	dBW
Receiver Line Loss	0.25	dB	(0.25)	dB
Spacecraft Receiving Antenna Gain	6.00	dBi	6.00	dBi
Received Carrier Power per User			(129.60)	dBW
Boltsman Constant	(228.60)	dBW	228.60	dBW
Thermal Noise Density (No)	(203.70)	dBWHz	203.70	dBWHz
C/No per User			74.10	dBHz
Data Rate	1,000.00	bps	(30.00)	
Mechanization Loss	1.00	dB	(1.00)	
Eb per User			(160.60)	dBHz
Eb/No per User			43.10	dB
Number of Simultaneous Users	81.00			
Spreading Bandwidth	1.45	MHz		
Interference (Io)			(170.05)	dBWHz
Eb / (No+Io)			9.45	dB
Coding Gain (K7, R1/2)			5.70	dB
Required Eb / (No+Io)			11.30	dB
Margin			3.85	dB

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Downlink - E-SAT to Meters

Center Frequency	137.50	MHz			
Transmitting RF Power	0.50	Watt	(3.01)		dBW
Transmitter Line Loss	0.50	dB	(0.50)		dB
Transmitting Antenna Gain	6.00	dBi	6.00		dB
EIRP per User			2.49		dBW
EIRP per User per 4 kHz			(21.49)		dBW
Free Space Path Loss	136.00	dB	(136.00)		dB
Atmospheric Loss	0.20	dB	(0.20)		dB
Rain Loss	-	dB	-		dB
Polarization Loss	0.50	dB	(0.50)		dB
Antenna Pointing Loss	0.30	dB	(0.30)		dB
Received Power Flux Density per User			(134.51)		dBW
Received PFD per User per 4kHz			(158.49)		dBW
Receiver Line Loss	0.77	dB	(0.77)		dB
Meter Receiving Antenna Gain	(3.00)	dBi	(3.00)		dBi
Received Carrier Power per User			(137.51)		dBW
Boltsman Constant	(228.60)	dBW	228.60		dBW
Thermal Noise Density (No)	(200.20)	dBWHz	200.20		dBWHz
C/No per User			62.69		dBHz
Data Rate	1,000.00	bps	(30.00)		
Mechanization Loss	1.00	dB	(1.00)		
Eb per User			(168.51)		dBHz
Eb/No per User			31.69		dB
Interference (Io)			(182.00)		dBWHz
Eb / (No+Io)			13.49		dB
Coding Gain (K7, R1/2)			5.70		dB
Required Eb / (No+Io)			11.30		dB
Margin			7.89		dB